

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of)
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Anette KARLSSON et al.) Group Art Unit: Unassigned
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Application No.: Unassigned) Examiner: Unassigned
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Filed: Herewith)
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For: METHOD FOR ELIMINATING)
DETRIMENTAL SUBSTANCES IN)
A PROCESS LIQUID)
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PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination of the above-captioned application, please enter the following amendment.

IN THE CLAIMS:

Please cancel Claims 1-17.

Please add the following new Claims 18-36.

18. (New) A method for inactivating detrimental substances in a process liquid comprising said detrimental substances, suspended material, and metal ions comprising hydroxide builders, said method comprising:

adding to the process liquid carbon dioxide in an amount sufficient to:

primarily form bicarbonate ions (HCO_3^-) having a pH-buffering effect;

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lower the pH of the process liquid to between 8 and 6.5;
primarily form metal hydroxides from said metal ions; and
cause said detrimental substances to coagulate or agglomerate with the metal
hydroxides, such that the detrimental substances adhere to the suspended
material and become inactive.

19. (New) The method of Claim 18, further comprising subsequently removing
said suspended material with said detrimental substances adhered thereto from said process
liquid.

20. (New) The method of Claim 18, wherein said lowered pH is between 7 and
7.5.

21. (New) The method of Claim 18, wherein said detrimental substances are
dissolved or suspended organic or synthetic organic material.

22. (New) The method of Claim 21, wherein said suspended organic or
synthetic organic material is wood resin, fiber fines, biological polymers, or latex.

23. (New) The method of Claim 18, wherein said detrimental substances are
dissolved or suspended inorganic material originating from Ca, P, Si, Mg, Mn, Fe, Cu, Al,
Zn, Si, or K.

24. (New) The method of Claim 18, wherein said process liquid is fresh water, a process liquor in a pulp manufacturing process, a process water in a paper manufacturing process, a liquid for the preparation of a paper coating composition, or waste water.

25. (New) The method of Claim 18, wherein said metal ions are Al^{3+} , Fe^{3+} , Fe^{2+} , Zn^{2+} , Cu^{2+} , or any combination of these.

26. (New) The method of Claim 18, wherein said suspended material comprises cellulose fibers, kaolin particles, or active sludge.

27. (New) The method of Claim 18, further comprising the step of:
using the suspended material with the thereto fixed metal ions and detrimental substances for paper manufacturing or incinerating with heat recovery.

28. (New) The method of Claim 18, wherein brightness of said suspended material, as measured by SCAN-P3:93, is stabilized or raised.

29. (New) The method of Claim 18, wherein said suspended material comprises wood-containing pulp fibers, and wherein said method further comprises the steps of:
subjecting said wood-containing pulp fibers to a lignin-preserving bleaching in at least one bleaching stage; and
storing thereafter in a storage tank during a retention time; and

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adding said carbon dioxide upstream or in said storage tank, so that brightness loss of said wood-containing pulp fibers, as measured by SCAN-P3:93, is less than 3 ISO %-units during said retention time.

30. (New) The method of Claim 18, wherein said suspended material originates from paper broke coated with a coating composition, and wherein said method further comprises the steps of:

storing said paper broke after disintegration in a paper broke tank during a storage time before being brought to a paper machine; and
adding said carbon dioxide upstream or in said paper broke tank, so that brightness of wood-containing pulp fibers of said paper broke, as measured by SCAN-P3:93, is raised by at least 1 ISO %-units during said storage time.

31. (New) The method of Claim 18, wherein said suspended material comprises kaolin particles suspended in said process liquid; said process liquid comprises a sodium hydroxide liquor; said detrimental substances comprise at least phosphorus; and said method further comprises the step of:

adding said carbon dioxide to the process liquid so that said suspended material obtains improved dewatering and a higher metal content and said process liquid obtains a lower metal content.

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32. (New) The method of Claim 18, wherein said suspended material comprises pulp fibers from recycled waste paper; said process liquid comprises water; said detrimental substances comprises at least synthetic organic material, and wherein said method further comprises the steps of:

subjecting said suspended material to a lignin-preserving bleaching; and
adding said carbon dioxide being added to the process liquid before said bleaching
so that said synthetic organic material is fixed onto said suspended material.

33. (New) The method of Claim 18, wherein said suspended material comprises pulp fibers of mechanical pulp; said process liquid comprises water and sodium hydroxide; said detrimental substances comprise at least dissolved organic material and residual peroxide-destroying metal ions; and wherein said method further comprises:

subjecting said suspended material to a lignin-preserving bleaching with hydrogen
peroxide (H_2O_2); and
bringing said suspended material to a paper machine after an intermediate storage
time; and
adding said carbon dioxide to the process liquid before said intermediate storage
time, so that said sodium hydroxide is converted to sodium bicarbonate
($NaHCO_3$); and said residual peroxide-destroying metal ions and said
dissolved organic material are fixed onto the suspended material.

34. (New) The method of Claim 18, wherein said process liquid comprises waste water; said detrimental substances comprise at least dissolved organic material; said suspended material comprising active sludge; and said method further comprises the steps of:

subjecting said suspended material to a dewatering; and
adding said carbon dioxide to said process liquid before said dewatering, so that
said dissolved organic material is fixed onto said suspended material; and
said dewatering is facilitated.

35. (New) The method of Claim 34, wherein said dissolved organic material is biological polymers originating from active sludge.

36. (New) The method of Claim 18, wherein said process liquid comprises water with temporary hardness; said detrimental substances comprise at least calcium bicarbonate; said suspended material comprises pulp fibers; and wherein said method further comprises:

forming the pulp fibers into a paper sheet in a paper machine at a process liquid
temperature lower than $+40^{\circ}\text{C}$; and
adding said carbon dioxide to the process liquid before the paper machine, so
that the dissolved calcium carbonate ($\text{Ca}(\text{HCO}_3)_2$) is converted to
calcium carbonate (CaCO_3) and said CaCO_3 adheres to said
suspended material.

REMARKS

Entry of the foregoing, and further and favorable consideration of the subject application on the merits are respectfully requested.

In the event that there are any questions concerning this amendment or the application in general, the Examiner is respectfully requested to telephone the undersigned so that prosecution of the application may be expedited.

Respectfully submitted,

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